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(56) Documents Cited
GB 2310592 A GB 2204231 A GB 2159700 A
GB 1571662 A GB 1167632 A GB 0719580 A

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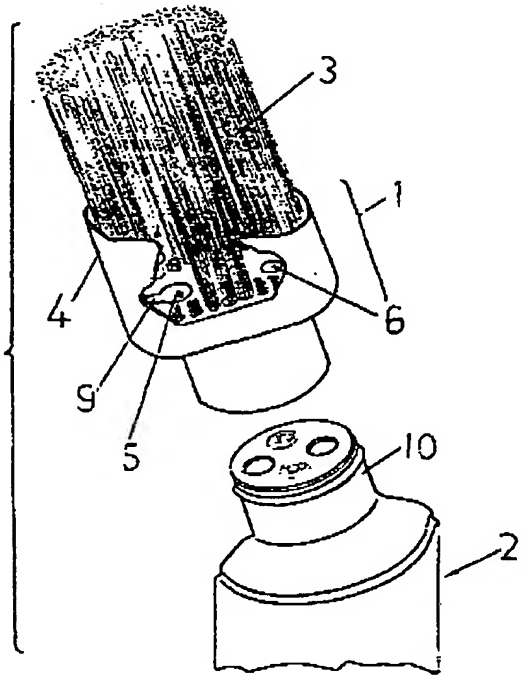
(54) Liquid applicator

(57) Liquid applicator comprises a body 1, discharge/drain duct 5 and air relief duct 6 through said body and a spreading means 3 attached to the body which may comprise of brush or pad. The perimeter of the body is extended to form a recess cup 4 within which excess liquid will be contained prior to returning into the container. Applicator body 1 is mountable on the inclined neck 10 of a squeezable container 2. A channel 9 intercepts the discharge/drain duct 5 to afford drainage of liquid. To enable return of liquid into the container the air relief duct 6 is arranged such that any head of liquid above it will always be less than that above the discharge/drain duct 5, additionally the diameter of the dispensing duct is greater than that of the air relief duct, affording self clearance of the air relief duct.

FIG1



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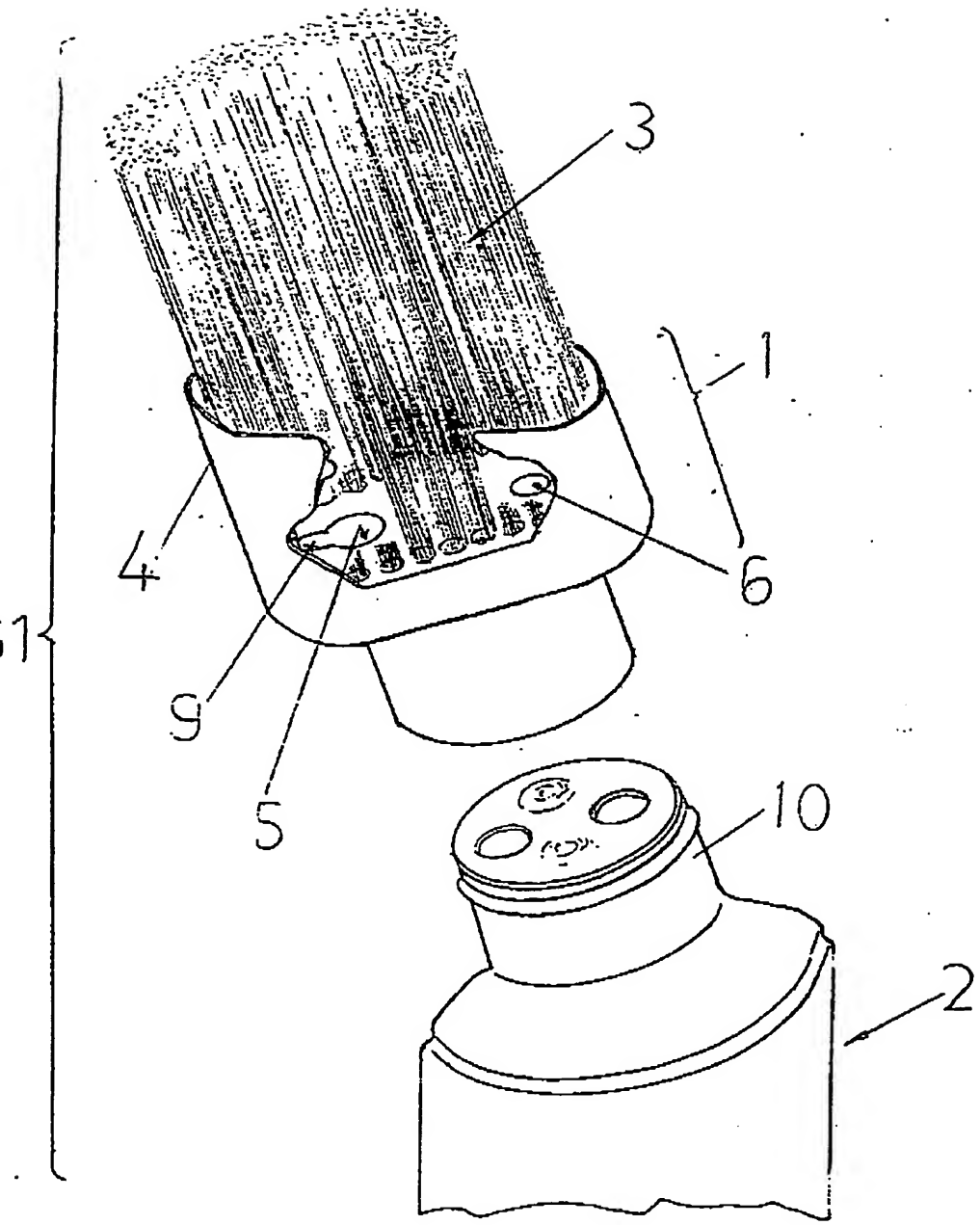


FIG1

FIG2

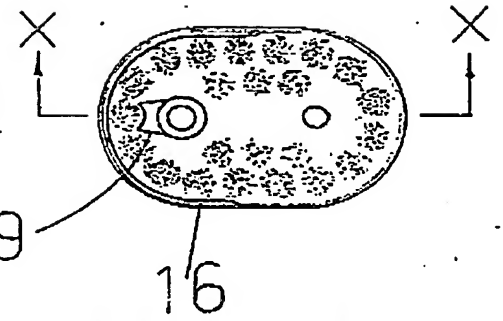


FIG3

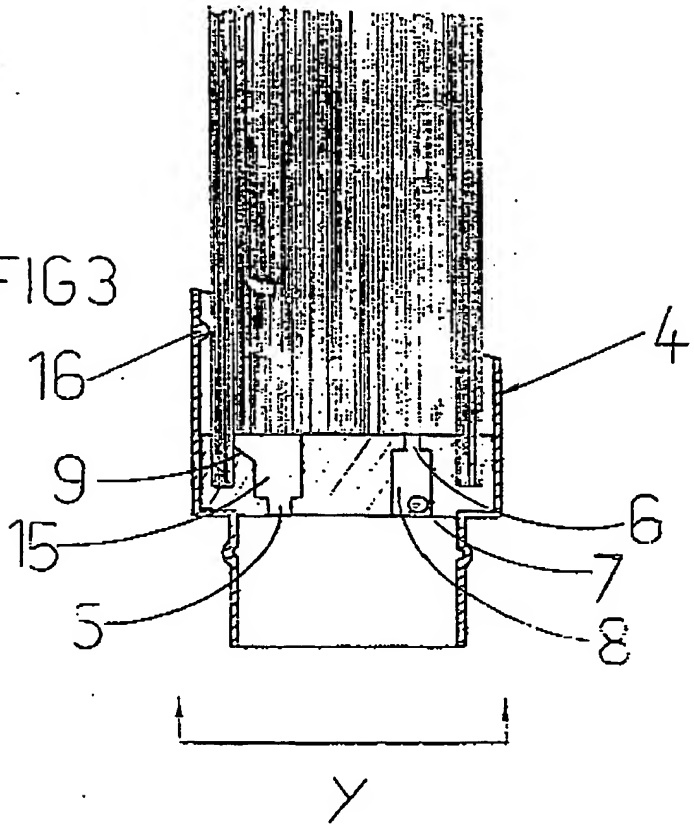


FIG 4

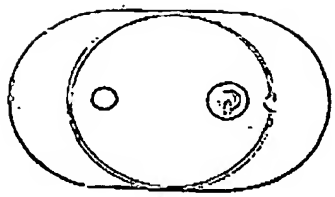


FIG 5

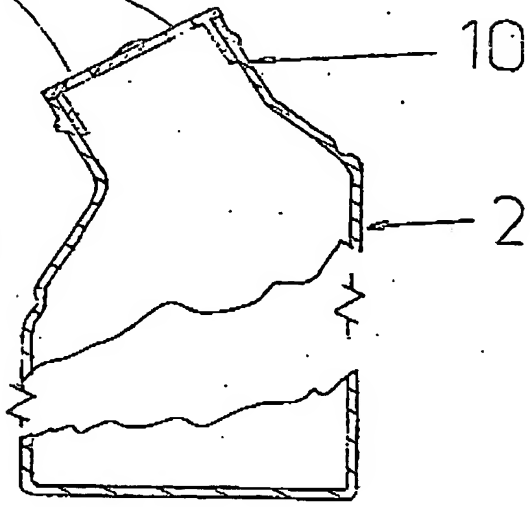
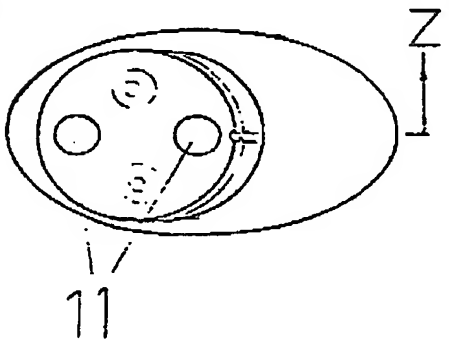


FIG 6



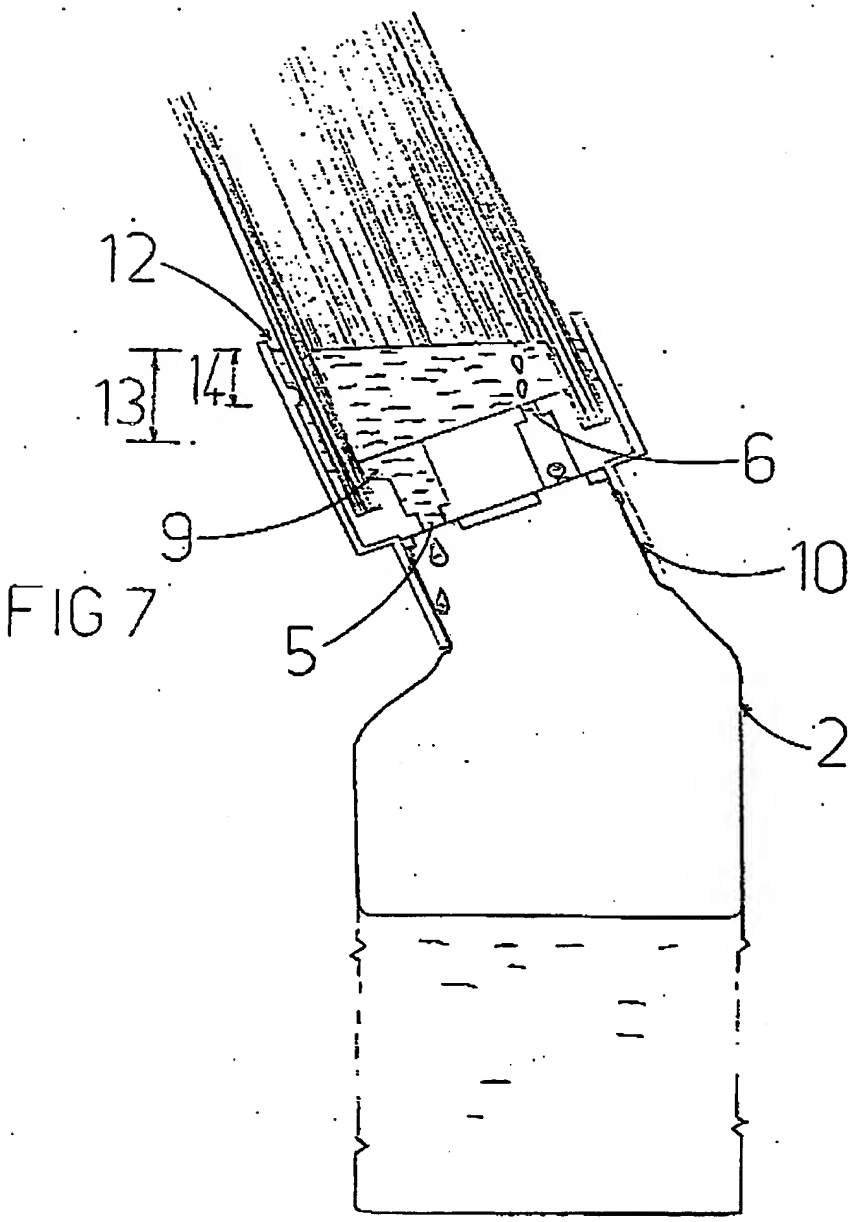


FIG 7

LIQUID APPLICATOR

This invention relates to an applicator device for dispensing and spreading a liquid over a surface.

Dispensing devices with brushes or pads arranged over the discharge outlet are well known and used for dispensing liquids of various types, viscosity's and consistencies. Present applicators suffer from the disadvantage that they do not allow all excess liquid loaded within the brush or pad to be contained and then returned to the dispensing container, consequently excess liquid may run out of the brush or pad out of the applicator and down the sides of the container creating inconvenience or hazard to the user.

An object of this invention is to provide an applicator to dispense a liquid onto a surface which after use, allows excess liquid loaded within the brush or pad of the applicator, to be contained and allowed to return to the dispensing container.

An example of use of this invention is an applicator through which an oil based liquid may be dispensed and spread for the protection and lubrication of blades or other metal parts of garden tools or machine tools. After use the applicator device may be conveniently set down and stored ready for further use. In this example minor contamination of the returning liquid does not present a problem for further use. Prior devices present problems of not containing and draining all quantities of excess liquid loaded within the brush or pad. To enable the device to be reliably used it is preferred that the liquid chosen should not 'dry' easily when exposed to air.

Applying a protective and lubricating film of oil onto garden tools requires the use of oil from a can and a brush or rag to spread it, alternatively an aerosol oil spray may be used. Using oil dispensed from the nozzle of a can either directly or through an appended brush head is inconvenient and likely to create drips. Using an aerosol spray tends to produce ' unwanted over spray' onto handles etc., but more importantly the low viscosity spray has a minimum oil content. The spray therefore tends to run off and drip, loosing its protective effective after a relatively short period of time.

The aim of the present invention is to address the previously stated disadvantages of application devices. The invention is not restricted to any specific liquid requiring application to a surface.

Accordingly, this invention provides an applicator for a liquid dispensing container, comprising a body, discharge/drain duct and air-relief duct through the body, an applicator attached to the body adjacent to the outlet of the ducts with the axis of the applicator extending generally parallel to the body. The perimeter of the body of the applicator extends parallel to the applicator to form a recess or 'containment cup' within which excess liquid will be contained prior to returning to the dispensing container via the discharge/drain duct.

Prevention of the liquid returning into the dispensing container, owing to a combination of surface tension and internal static air pressure, through a small discharge/drain duct will be removed by the dispensing container being freely ventilated by the air relief duct.

LIQUID APPLICATOR

Preferably the discharge/drain duct and air-relief duct would be positioned adjacent to and within the hollow of the applicator brush elements or pad. The opportunity for liquid to discharge through the air-relief duct during use would be restricted by a free moving ball, typically of metal or plastic, contained within a recess set directly within the base of the duct. The ball would fall across and block the base of the narrower part of the duct when the dispensing container is tipped forward and squeezed.

Preferably the applicator would be combined with a resilient squeezable plastic dispensing container and retained to said container by a conventional snap-in bead and groove, the applicator would be affixed to a dispensing container extended neck which is inclined from the perpendicular of axis of its main body.

Preferably the combined container and applicator would be provided with a plastic cap retained to the container by conventional snap-in bead and groove.

After use the container would normally be stored upright the applicator remaining at an incline, to enable drainage of excess liquid. However in a preferred embodiment, the applicator would comprise an extended bore forming a chamber that when snapped onto the dispensing container, may be rotated to form a seal between the dispensing container and the applicator ducts. This feature would prevent spillage in the event of the device being knocked over or stored in a non-upright position, and in particular during distribution, prior to initial use. . This feature is well proven in other applicator devices.

A preferred embodiment of the applicator comprises a brush of natural , synthetic, or a mix of such fibres. The brush elements may be secured within the body by conventional bar anchor or staple means within, as an example, pre-formed recesses of the body or within an epoxy resin. Arrangement of the brush elements may be varied to meet the task, however adequate free space should be allowed between the brush elements and the ducts to ensure free flow of dispensed liquid , unrestricted container ventilation and unrestricted drainage of excess liquid.

Preferably the applicator body is made of plastic materials.

It is envisaged that the applicator, cap and dispensing container would be provided as a filled unit, however it may be filled or re-filled by the user.

LIQUID APPLICATOR

In the preferred form, an embodiment of the invention will now be described by way of example only, with reference to the accompanying drawings in which:-

Figure 1 shows in perspective a cut-away view of the applicator according to the invention and a part of a container on which the applicator may be mounted..

Figure 2 shows a plan view of the applicator.

Figure 3 shows a sectional view of the applicator on the line XX in Figure 2.

Figure 4 shows a view of the base of the applicator in the direction Y of Figure 3.

Figure 5 shows a sectional view of a portion of a container on the line ZZ in Figure 6.

Figure 6 shows a plan view of a container Figure 5 on which the applicator may be mounted.

Figure 7 illustrates the initial liquid accumulation and mode of drainage after use of the applicator.

Referring to the drawings, the device comprises an applicator body 1 mountable onto the inclined neck 10 of a resilient, squeezable hand held container 2 in which is stored a liquid, for example oil.

A spreading means comprising a plurality of parallel brush elements 3 arranged in a form similar to a conventional paint brush with a hollow central section, is supported within the body 1 either anchored by conventional bar or staple within pre-formed recesses or as a pre-moulded insert. The length of the brush elements is such that during use the tips converge in the same manner as conventional paint brushes.

The applicator body 1 within which the brush elements are supported has its wall extended beyond the exposed base of the brush elements to form a containment cup 4, the rim of the containment cup is arranged such that when the applicator body is affixed to the inclined neck of a dispensing container the upper rim remains near to horizontal when the container is stored ready for use.

A discharge/drain duct 5 extends through the body to the base of the brush elements within the hollow central section, to provide a through passage for the liquid. A channel 9 is extended between the duct 5 wall and the brush elements to ensure effective return drainage of accumulated liquid within the cup 4 after use.

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An air relief duct 6 extends through the body to the base of the brush elements to provide a passage for air pressure equalisation. During use, flow of liquid through this duct 6 is restricted by a simple valve, by way in this example comprising a free moving sphere 7 contained within a simple pre-formed valve chamber 8 directly beneath the duct 6 entrance. It is envisaged that other known valves such as a simple articulated flap, producing the same effect may alternately be utilised.

During use, the brush is charged by inverting and squeezing the dispensing container causing the liquid to flow through the duct 5. Excess flow of liquid to the brush through the air relief duct 6 is prevented by the free moving sphere falling across the duct. The rate of liquid flow is determined by extent of squeeze on the dispensing container and a combination of the diameter of the discharge/drain duct and the nature of the liquid.

The brush elements are arranged immediately adjacent to each other around the discharge duct 5 and air relief duct 6, to form a conduit along which the liquid may flow towards the tips of the brush elements in a more controlled manner.

The device may then be used in a similar manner to a conventional paint brush to coat a surface.

During frequent use the containment cup may not be allowed sufficient time to drain completely. To minimise the opportunity of liquid to freely run from the front edge 12 of the rim of the cup when tilted forward during such frequent use, the brush elements are arranged closely adjacent to the walls of the cup 4 such that excess liquid is held by a combination of surface tension and capillary action between the walls of cup 4 and the brush elements. To assist this process a preferred embodiment of the cup is that a continuous bead 16 projects below and within the front half of the inner rim of the containment cup 4 against which the brush elements lightly touch. Thus when the applicator is tilted forward during use, excess liquid remaining within the cup is restricted from running directly out of the front of the containment cup 4 and is directed towards and attracted by capillary action into the brush elements.

After use the dispensing container may be rested in an upright position whereby the excess liquid within the brush, gradually drains down and through the brush elements into the containment cup 4 .

The applicator 1 is mounted onto the dispensing container neck 10 which is inclined at an acute angle with respect to the axis.. Liquid will accumulate towards the front of the applicator containment cup 4 and subsequently drain into the dispensing container 2 via the channel 9 and through the duct 5. The channel 9 is inclined into the duct 5 to ensure that all excess liquid may freely drain. Static air pressure preventing the excess liquid draining into the dispensing container is relieved by the air relief duct 6, the sphere 7 having fallen away from the duct entrance. When the applicator is mounted on the angled neck 10 of the dispensing container 2, the top of duct 6 is above that of the top of duct 5 enabling free ventilation of the dispensing container. Additionally liquid will tend to run by the action of gravity away from duct 6 towards duct 5.

After frequent use, when the dispensing container is returned to an upright position to allow liquid to drain, the air relief duct 6 may also become covered by liquid. The applicator is always inclined from the horizontal to enable the depth 13 of excess liquid above duct 5 to be greater than the depth 14 of any excess liquid above duct 6. The hydraulic head pressure exerted by excess oil across the diameter of duct 5 will exceed that of the hydraulic head pressure exerted by excess oil across the diameter of duct 6. Additionally, the diameter of discharge duct 5 is also greater than that of air relief duct 6. The combination of differing head pressure across each duct and differing diameters of ducts enables air from the dispensing container to be forced through the smaller diameter air relief duct 6 allowing liquid to drain through the larger diameter duct 5. Liquid above duct 6 eventually being uncovered.

Duct 5 is counter bored to a larger diameter 15 to reduce resistance to the draining liquid, whilst duct 6 is counter bored to produce a valve chamber 8 and additionally reduce the effect of capillary action holding liquid within the duct.

Release of the bottle to its original shape accelerates the initial draining process through the duct 5 and assists in clearing any residual liquid within the duct 6, by the initial suction created.

For convenience in preventing spillage during transportation and after the applicator has been allowed to drain, the applicator is arranged such that when fitted onto the inclined neck 10 of the dispensing container 2 it may be rotated (through 90 degrees) to seal the flow of liquid by non-alignment of the duct 5 and valve inlet chamber 8 with the outlet apertures 11 of the dispensing container. Other well documented designs of 'twist-to-seal' dispensing heads may equally be adopted.

The preferred embodiment of the applicator herein described provides, by means of being attached onto the inclined neck of a dispensing container, the height differential between the discharge/drain duct and the air relief duct necessary to effect correct operation previously described. Additionally an advantage in ease of use is gained by the brush elements being inclined forward with respect to the dispensing container when held in the hand. It is apparent that should the applicator be considered for mounting to an upright neck of a dispensing container , the height differential between ducts may be achieved by the surface of the base of the containment cup being formed at an obtuse angle with respect to the axis of the dispensing container neck, thus affording the same effect. The brush elements and walls of the containment cup may then be inclined with respect to the axis of the extended bore of the applicator that attaches to the upright neck of a dispensing container. Other features of the embodiment herein described are maintained.

A further example of use of the said invention is a convenient method to apply a thin film of cooking oil onto kitchen utensils, such as frying and baking pans.

CLAIMS

1 An applicator for a liquid dispensing container comprising a body the sides of which are extended to form a containment cup, a discharge/drain duct and air relief duct through said body and an applicator-means attached to and extending generally parallel to said body adjacent to and surrounding said ducts such that the said applicator forms a conduit for liquid flow.

2 An applicator as claimed in claim 1 in which the discharge/drain duct is at a lower level with respect to the air relief duct when said applicator is mounted on the inclined neck of a dispensing container such that the head of any liquid within the containment cup is greater above the discharge/drain duct than that of the air relief duct to provide a hydraulic advantage for the draining liquid to overcome any static air pressure within the dispensing container.

3 An applicator as claimed in claim 1 or 2 in which the dispensing drain duct is of a larger diameter than the air relief duct to provide additional hydraulic advantage for the draining liquid to overcome any static air pressure within the dispensing container and allow air to discharge through and clear any liquid within the air relief duct.

4 An applicator as claimed in any preceding claims in which a part of the discharge/drain duct is counter-bored to a larger diameter to reduce effect of capillary action and wall resistance to liquid drainage and enable maximum hydraulic pressure of said liquid produced at the discharge/drain duct.

5 An applicator as claimed in any preceding claims in which a channel intercepts the discharge/drain duct to enable complete drainage of said containment cup when said applicator is attached to an inclined neck of a dispensing container.

6 An applicator as claimed in any preceding claims in which the air relief duct is counter-bored and a spherical ball inserted to produce a one-way valve chamber to restrict liquid flow being discharged through said air relief duct when the applicator is tilted forward .

7 An applicator as claimed in any preceding claims in which a part of the air relief duct is counter-bored to a larger diameter to reduce the effect of liquid being held within the base of the air relief duct by capillary action and enable unrestricted passage of air.

8 An applicator as claimed in any preceding claims in which the rim of the front of the containment cup is extended such that when said applicator is attached to the inclined neck of the dispensing container the entire rim of said applicator remains near to horizontal.

9 An applicator as claimed in any preceding claims made from plastics, nylon or metal materials or a combination of these materials.

10 An applicator as claimed in any preceding claims in which said applicator comprises of brush elements anchored within recesses by bar anchor or staple arranged adjacent to and extending generally parallel with the axis of the ducts.

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CLAIMS

11 An applicator as claimed in any preceding claims in which the brush elements are arranged sufficiently adjacent to the walls of the containment cup such that a combination of capillary action and surface tension between the brush elements and wall holds excess liquid during use minimising liquid dripping out of the containment cup.

12 An applicator as claimed in any preceding claims in which a continuos bead projects within and beneath the front half of the containment cup against which the adjacent brush elements would lightly touch enabling excess liquid to be directed towards and into said brush elements preventing liquid dripping from the rim of the containment cup during use.

13 An applicator as claimed in any preceding claims in combination with a squeezable and resilient dispensing container.

14 An applicator substantially as herein described and illustrated in the accompanying drawings

Amendments to the claims have been filed as follows:

1 An applicator for a dispensing container for use in the application of vegetable, mineral or synthetic oils to inanimate surfaces, comprising a body the sides of which are extended to form a containment cup arranged such that after use, excess liquid accumulates across a discharge/drain duct to create a hydraulic advantage to enable operation of a self clearing air relief duct through said body with an applicator means attached to and extending generally parallel to said body adjacent to and surrounding said ducts such that the said applicator forms a conduit for liquid flow.

2 An applicator as claimed in claim 1 in which the discharge/drain duct is, when not in use, at a lower level with respect to the air relief duct when said applicator is mounted on the inclined neck of a dispensing container such that excess liquid runs towards and across the discharge/drain duct and the head of such liquid will be greater than any liquid within or above the air relief duct, thus providing a hydraulic advantage for the liquid to overcome any static air pressure within the dispensing container enabling liquid to return to the dispensing container.

3 An applicator as claimed in claim 1 or 2 in which the dispensing drain duct is of a larger diameter than the air relief duct to provide additional hydraulic advantage for the draining liquid to overcome any static air pressure within the dispensing container and allow air to discharge through and clear any liquid within the air relief duct.

4 An applicator as claimed in any preceding claims in which a part of the discharge/drain duct is counter-bored to a larger diameter to reduce effect of capillary action and wall resistance to liquid drainage and enable maximum hydraulic pressure of said liquid produced at the discharge/drain duct.

5 An applicator as claimed in any preceding claims in which an open channel is specifically inclined towards the discharge/drain duct to enable complete drainage of said containment cup when said applicator is attached to an inclined neck of a dispensing container and not in use.

6 An applicator as claimed in any preceding claims in which a part of the air relief duct is counter-bored to a larger diameter to reduce the effect of liquid being held within the base of the air relief duct by capillary action and further minimise restriction to the passage of air.

7 An applicator as claimed in any preceding claims in which the rim of the front of the containment cup is extended such that when said applicator is attached to the inclined neck of the dispensing container and not in use, the entire rim of said applicator remains near to horizontal but the base of the containment cup remains inclined towards the front to facilitating drainage of liquid.

8 An applicator as claimed in any preceding claims in which the brush elements are arranged sufficiently adjacent to the walls of the containment cup such that a combination of capillary action and surface tension between the brush elements and wall holds excess liquid during use minimising liquid dripping out of the containment cup.

CLAIMS

9 An applicator as claimed in any preceding claims in which a continuos bead projects within and beneath the front half of the containment cup against which the adjacent brush elements would lightly touch enabling excess liquid to be directed towards and into said brush elements preventing liquid dripping from the rim of the containment cup during use.

10 An applicator as claimed in any preceding claims in combination with a squeezable and resilient dispensing container.

11 An applicator substantially as herein described and illustrated in the accompanying drawings

The Patent Office

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Application No:	GB 9723493.4	**Examiner:**	G WERRETT
Claims searched:	1-14	**Date of search:**	29 January 1998

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.P): A4K.

Int Cl (Ed.6): A46B.

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage		Relevant to claims
PX	GB 2310592 A	(GILLETTE) see chamber 20 drawing ink back thro' channel 7.	1
X	GB 2204231 A	(MITSUBISHI) see ventilator hole 14, page 3, ll 19-23.	1
X	GB 2159700 A	(MOINE) see e.g. page 2, line 52 on.	1
X	GB 1571662	(BRISTOL) see channel 19, vent 40.	1
X	GB 1167632	(DAI) see page 2, line 42 on.	1
X	GB 0719580	(BUTCHER) see cup 5, 13, ducts 9, 10, 18, 19.	1

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.